Hidden Gems for Web Apps

Session 503

Anton D'Auria
Safari on iOS and WebKit Engineer

These are confidential sessions—please refrain from streaming, blogging, or taking pictures

3G
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Monday
6
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Newsstand
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Settings
Phone
Mail
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What You'll Learn

Gems in your Web App

- Touch and gestures
- Geolocation
- Motion
- Offline and faster
- Looking great as an iOS app

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Touch and Gestures

Demo

Touch and gesture events

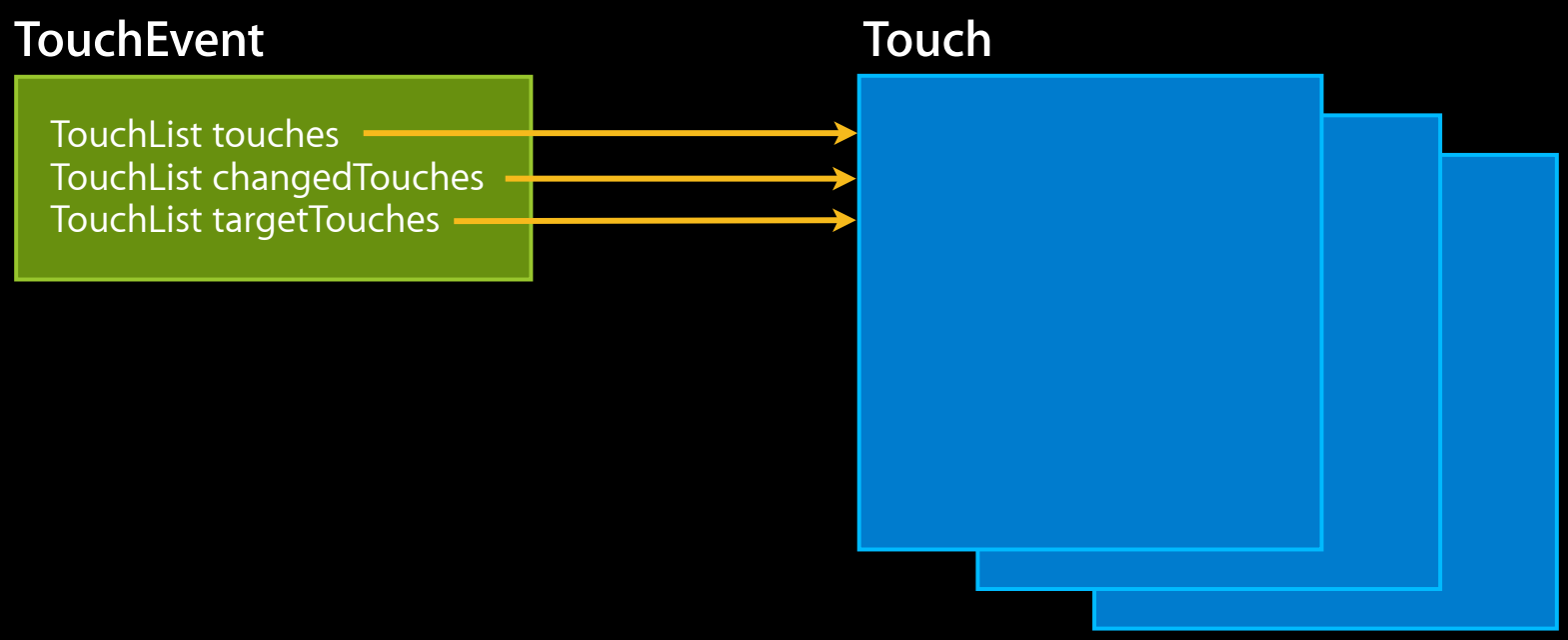
JavaScript Touch Event Model

touchstart	A finger is placed on the screen
touchmove	A finger moves on the screen
touchend	A finger is removed from the screen
touchcancel	Touches have been interrupted

TouchEvent Object

Three fingers down

```
element.addEventListener('touchstart', handleTouchStart, false);
function handleTouchStart(touchEvent) { ...
```



Touch Object

One for each finger

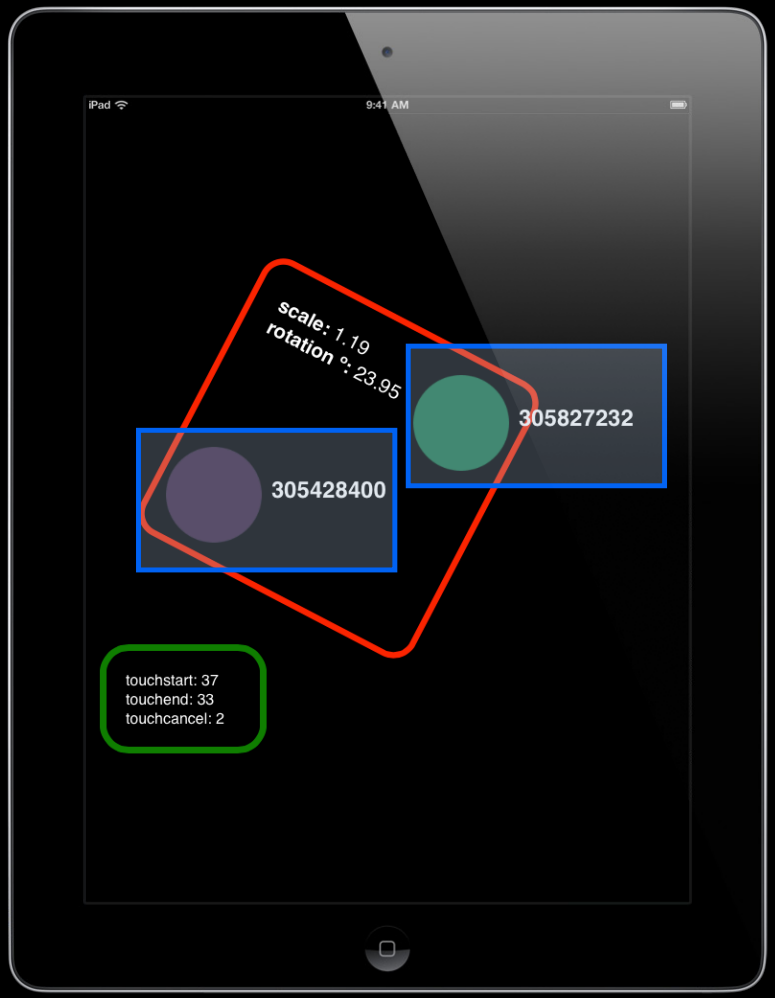
Touch

unsigned long identifier

EventTarget target

long screenX
long screenY

long pageX
long pageY



Touch Object

DOM target

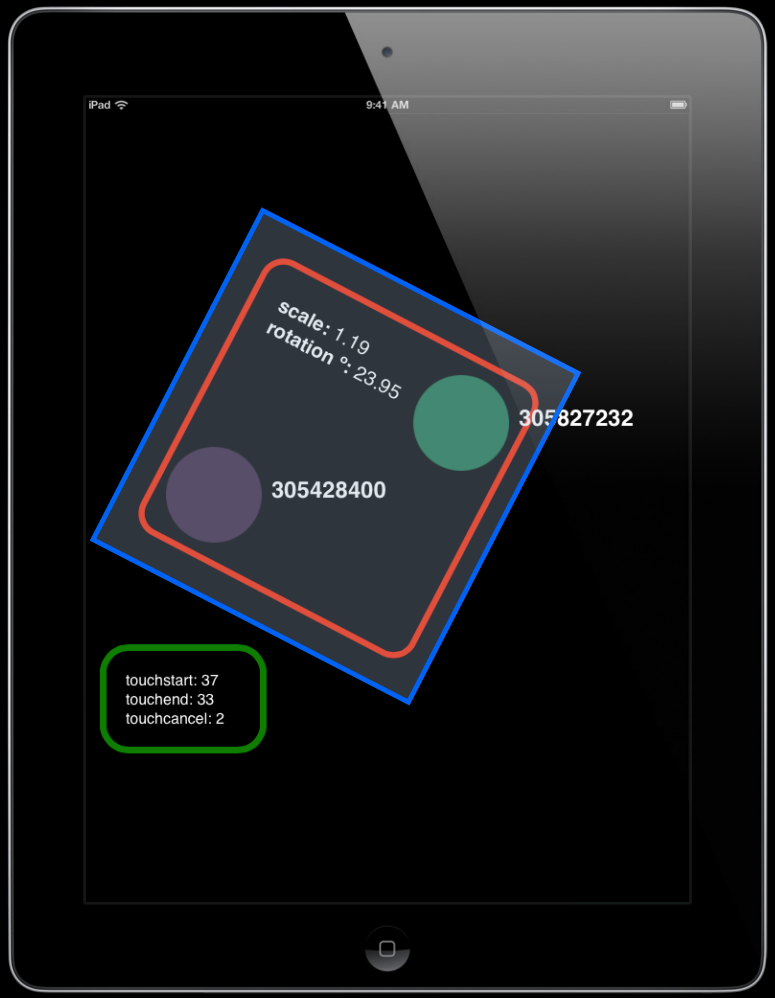
Touch

unsigned long identifier

EventTarget target

long screenX
long screenY

long pageX
long pageY



Touch Object

Place on screen and page

Touch

unsigned long identifier

EventTarget target

long screenX
long screenY

long pageX
long pageY

screenX
screenY

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Apple Developer
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Member Center
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Here's where it all happens for Apple developers.
iPhone Dev Center
Find a wealth of technical resources for developing innovative applications for iPhone OS.
Mac Dev Center
A complete set of resources for developing with the powerful technologies in Mac OS X.
Safari Dev Center
Resources for designing and creating websites for Safari on iPhone, Mac, and Windows.
More Development Resources
WWDC 2010
The premier technical conference for developers innovating with Apple technologies.
June 7–11, Moscone West
San Francisco, CA
Learn more
Learn Why You'll Love to Develop with Apple Technologies
Read about our powerful, yet easy to use tools and technologies that allow you to turn your concepts into reality.
Join the iPhone Developer Program
Get all the tools and information you need to develop and distribute applications for iPad, iPhone and iPod touch.
Join the Mac Developer Program
Gain access to a range of technical resources to assist you in developing innovative applications for Mac OS X.

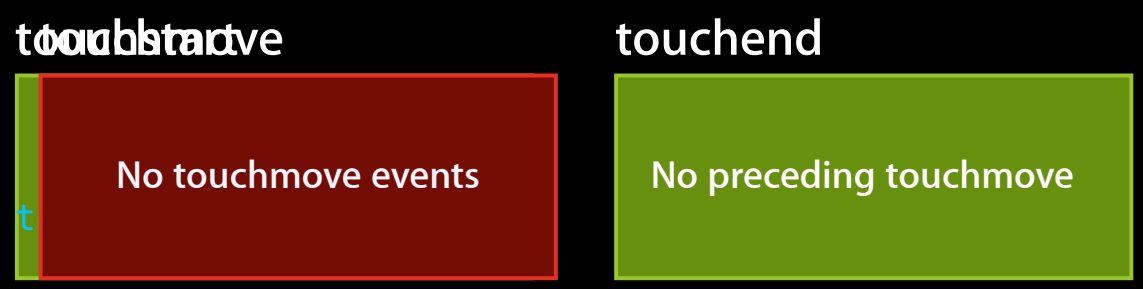
screenX
screenY

pageX
pageY

TouchEvent Uses

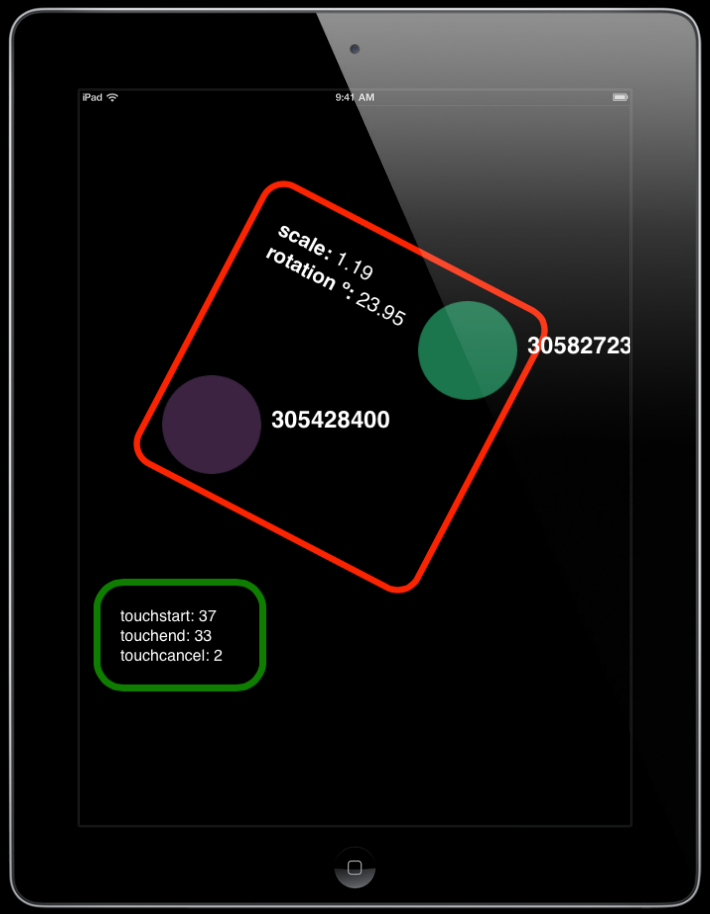
Create custom gestures

- Track multiple fingers
- Two-finger tap



What About Pinch to Zoom?

- Provided as `GestureEvent` in JavaScript!



JavaScript Gesture Event Model

gesturestart	A second finger is placed on the screen
gesturechange	One or more fingers move on the screen
gestureend	Second finger is removed from the screen

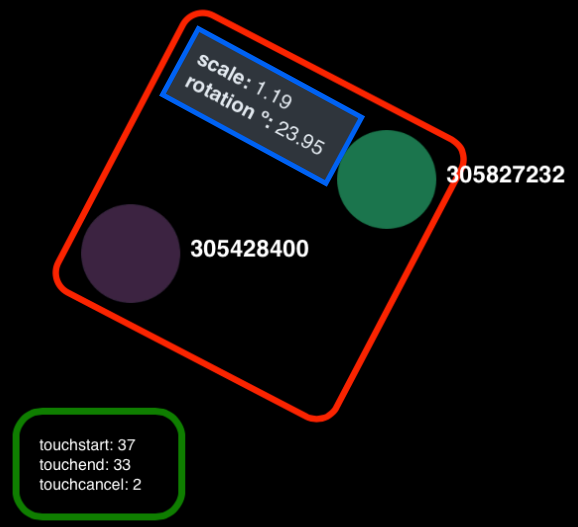
GestureEvent Object

```
element.addEventListener('gesturechange', scaleAndRotateBox, false);
function scaleAndRotateBox(gestureEvent) { ...
```

GestureEvent

float scale
float rotation

long pageX
long pageY



GestureEvent Usage

Scaling and rotating using webkitTransform

```
var startScale = 1;
var startRotation = 0;
element.addEventListener('gesturechange', scaleAndRotateBox, false);
function scaleAndRotateBox(event) {
    event.target.style.webkitTransform = 'scale('+ event.scale * startScale
     +') rotate('+ event.rotation + startRotation + 'deg)';
}
// Save scale and rotation for next gesturestart event.
element.addEventListener('gestureend', saveScaleAndRotation, false);
function saveScaleAndRotation(event) {
    startScale *= event.scale;
    startRotation += event.rotation;
}
```

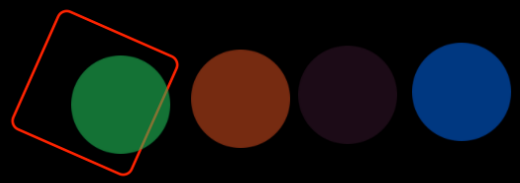
Disable Automatic Scrolling

Use preventDefault

```
document.body.addEventListener('touchmove', function(event) {
  event.preventDefault();
}, false);
```

Keep Touch Event Handlers Simple

- Use `setInterval` to run complicated JS asynchronously
- Avoid additional page layouts
- Applying transforms to scale or rotate is fine



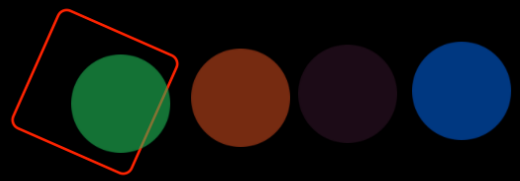
Demo

Touch and gestures

Matt Lilek
iOS Safari and WebKit Engineer

Touch Gems Review

- Add dynamism and intuitive UI with multitouch
- Use `TouchEvent` to track fingers or for custom gestures
- Use `GestureEvent` for pinch/zoom/rotate
- Handle `touchcancel`
- Prevent scrolling
- Keep touch event handlers simple
- Try it!



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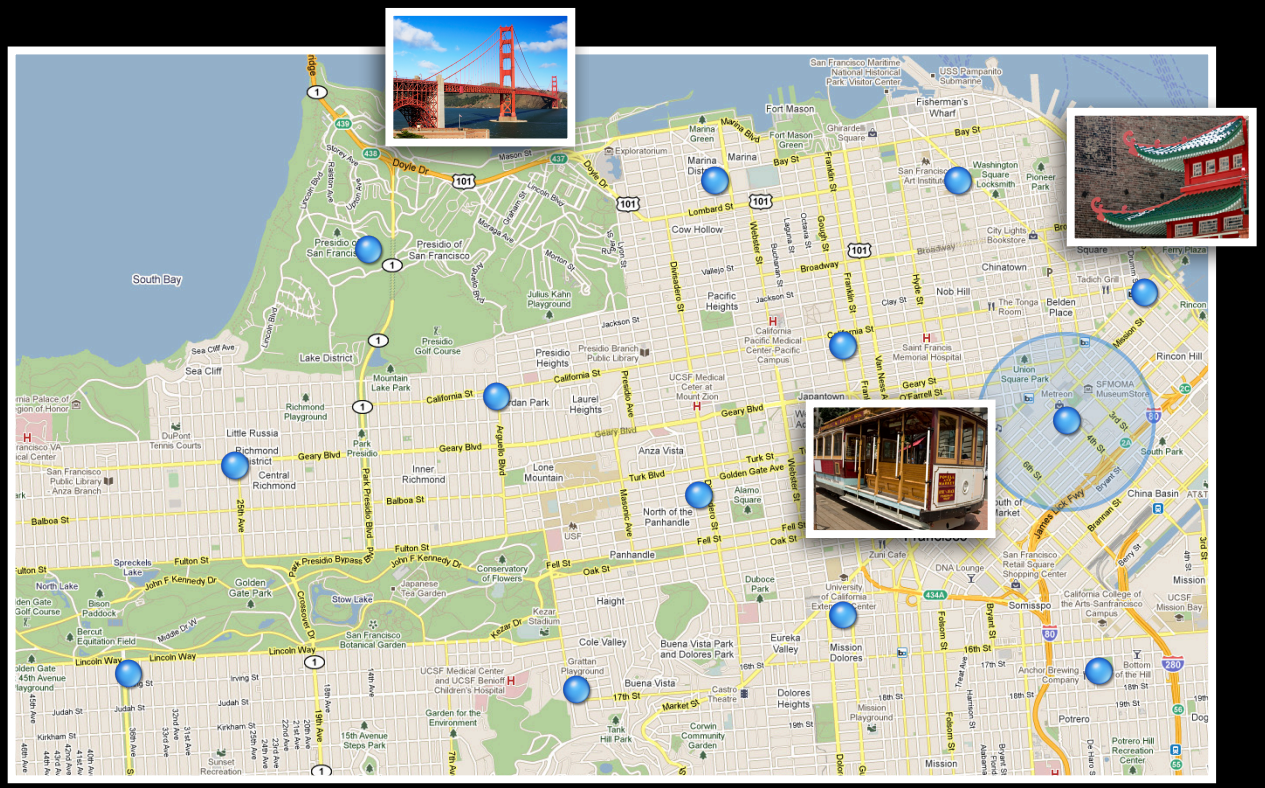
Geolocation



Geolocation Interface

Asynchronous JavaScript API

navigator.geolocation.**getCurrentPosition**	One-shot position request
navigator.geolocation.**watchPosition**	Request repeated updates
navigator.geolocation.**clearWatch**	Cancel watchPosition updates

Geolocation Usage

Use cached position

```
navigator.geolocation.getCurrentPosition(successCallback,
                                         errorCallback,
                                         {maximumAge:600000});
// maximumAge, in milliseconds, guarantees
// location is at most 10 minutes old.
var latitude, longitude;
function successCallback(position) {
  latitude = position.coords.latitude;
  longitude = position.coords.longitude;
}
function errorCallback(error) {
  // error.code can be:
  // error.PERMISSION_DENIED, error.POSITION_UNAVAILABLE, error.TIMEOUT
}
```

Geolocation Usage

For greater precision use watchPosition

- getCurrentPosition is fast, but can have lower precision

```
var watchId = navigator.geolocation.watchPosition(function(position) {
  // Use position.coords.latitude, position.coords.longitude.
}, handleError);

function doneTracking() {
  // Cancel location updates
  navigator.geolocation.clearWatch(watchId);
}
```

Geolocation Privacy

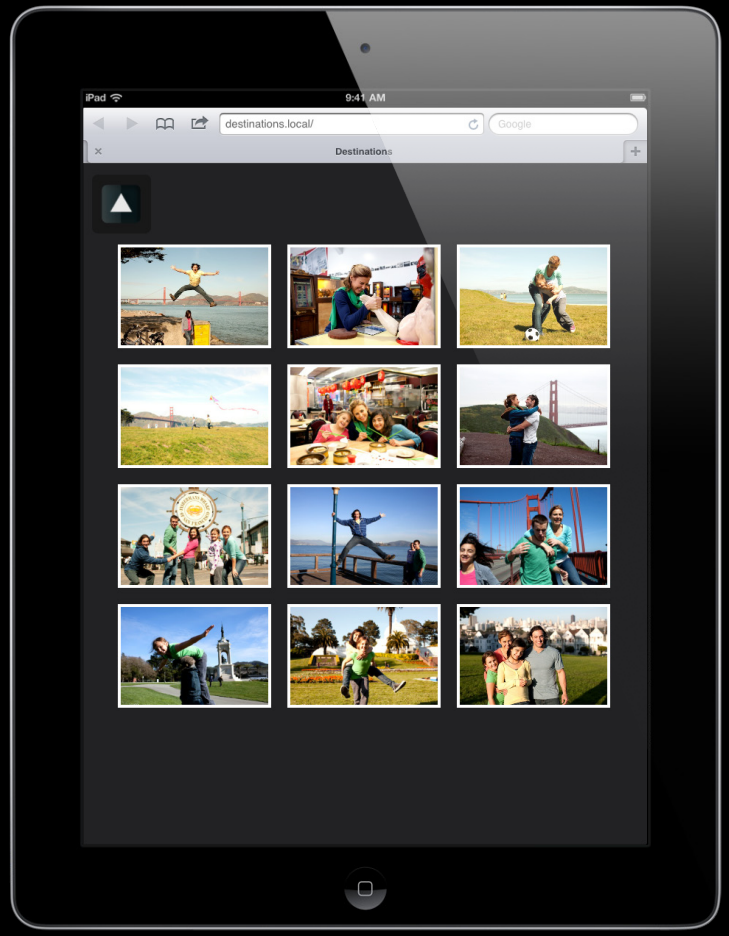
- User is asked permission every 24 hours per domain

Geolocation Demo

Matt Lilek
iOS Safari and WebKit Engineer

Geolocation Gems Review

- Location awareness adds context to your app
- Determine and monitor user's location
- Handle errors (no service, no permission from user)
- Be mindful of power consumption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Orientation and Motion

Orientation and Motion Event Model

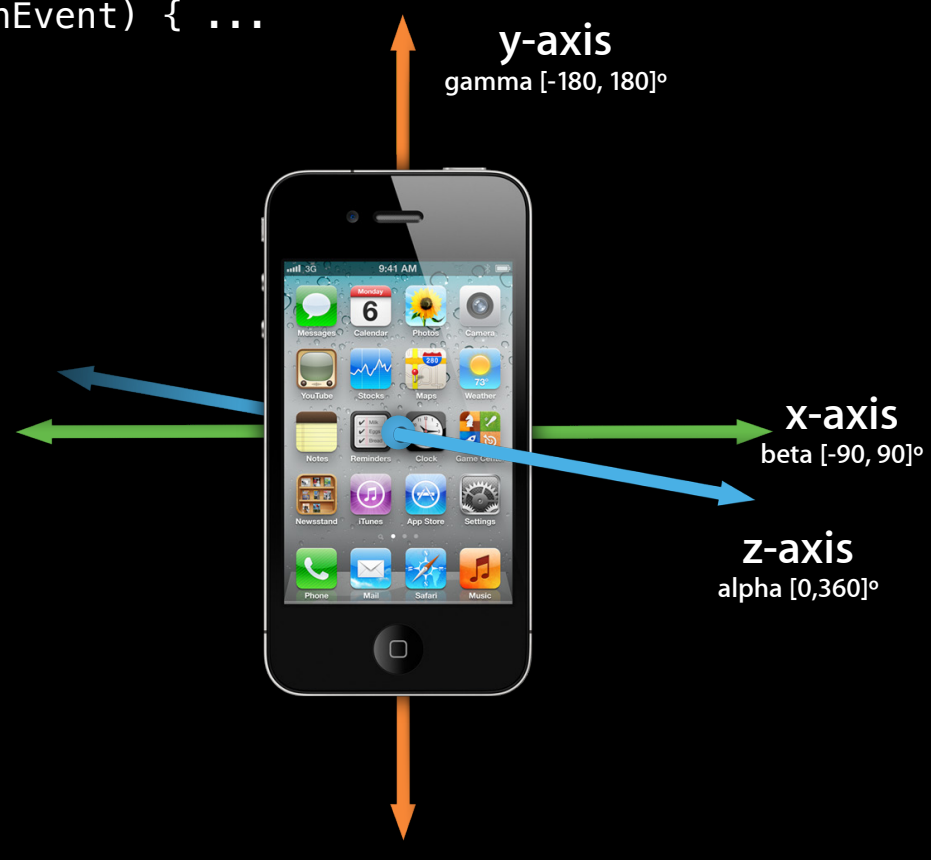
onorientationchange	Portrait or landscape—Not enough!
deviceorientation	Precisely, how is the device held?
devicemotion	What are the forces on the device?

DeviceOrientationEvent Object

```
window.addEventListener('deviceorientation', onOrientation, false);
function onOrientation(deviceOrientationEvent) { ...
```

DeviceOrientationEvent

alpha	[0,360]º
beta	[-90, 90]º
gamma	[-180, 180]º
webkitCompassHeading	[0,360]º
webkitCompassAccuracy	> 0º



DeviceOrientationEvent Object

DeviceOrientationEvent

alpha	[0,360]°
beta	[-90, 90]°
gamma	[-180, 180]°
webkitCompassHeading	[0,360]°
webkitCompassAccuracy	> 0°

- New in iOS 5
  - webkitCompassHeading (0° is north, 180° is south)
  - webkitCompassAccuracy (> 0°, -1 on error)
- Don't use alpha for compass reading
- Device support
  - iPad 2, iPhone 4, and latest iPod touch

What About Shake?

DeviceMotionEvent Object

DeviceMotionEvent

acceleration (m/s^2)	Rate of velocity change along x, y, z axes
accelerationIncludingGravity (m/s^2)	Rate of velocity change including gravity
rotationRate (alpha, beta, gamma)	Rotation of device since last event
interval (milliseconds)	Time since last event was fired

Demo

Orientation and motion

Matt Lilek
iOS Safari and WebKit Engineer

Orientation and Motion Review

- Orientation tells us how the device is held
  - Precise degrees of rotation
  - Use `webkitCompassHeading` instead of alpha for geo direction
- Motion lets us use force as UI input
  - Gravitational forces in 3D

Offline and Faster

HTML5 Application Cache

- Makes apps run offline, faster online
- Atomic updates of your application
- Specify what can be accessed from the network
- Use Web SQL Database, LocalStorage for app-created data

Using HTML5 Offline Storage	Marina Thursday 3:15PM

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Looking Great as an iOS App

- CSS for retina display and orientations
- Launch your Web App as an iOS app
- Looking great on the Home Screen
- As your app loads…startup images

Resolution-Specific CSS

Use CSS media queries

- Simplifies separation of styles
- Avoids loading images with wrong resolutions

```
<link rel="stylesheet" media="(max-device-width: 480px)
 and (-webkit-min-device-pixel-ratio: 2)" href="iphone-4.css">

<link rel="stylesheet" media="(max-device-width: 480px)
 and not (-webkit-min-device-pixel-ratio: 2)"
 href="iphone.css">

<link rel="stylesheet" media="(min-device-width: 481px)
 and (max-device-width: 1024px)" href="ipad.css">
```

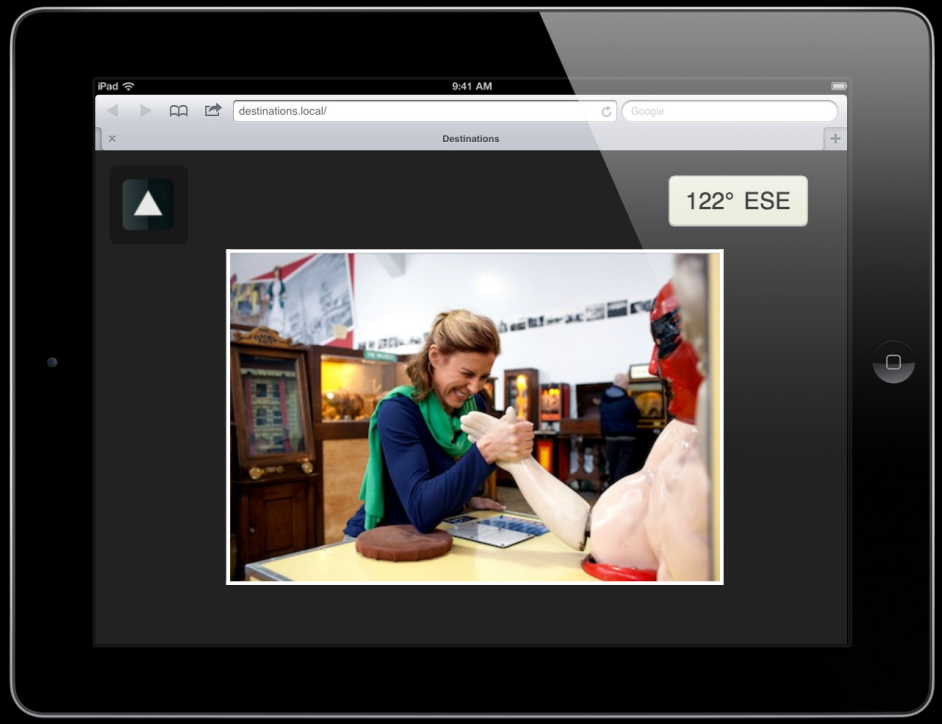
Orientation-Specific CSS

Use CSS media queries for orientations

- `<link>` tag will not work for orientations—isn't reloaded on orientation change

```
@media (orientation: portrait) {
    /* styles and images for portrait */
    body { background-image:url('portrait.png') }
}

@media (orientation: landscape) {
    /* styles and images for landscape */
    body { background-image:url('landscape.png') }
}
```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Launch from Home Screen

Save to Home Screen

- Action button from Safari
- Know when you're not in Safari

```
if (navigator.standalone) {...
```

Home Screen Icons

Support retina display

- Specify app icon for different screen resolutions

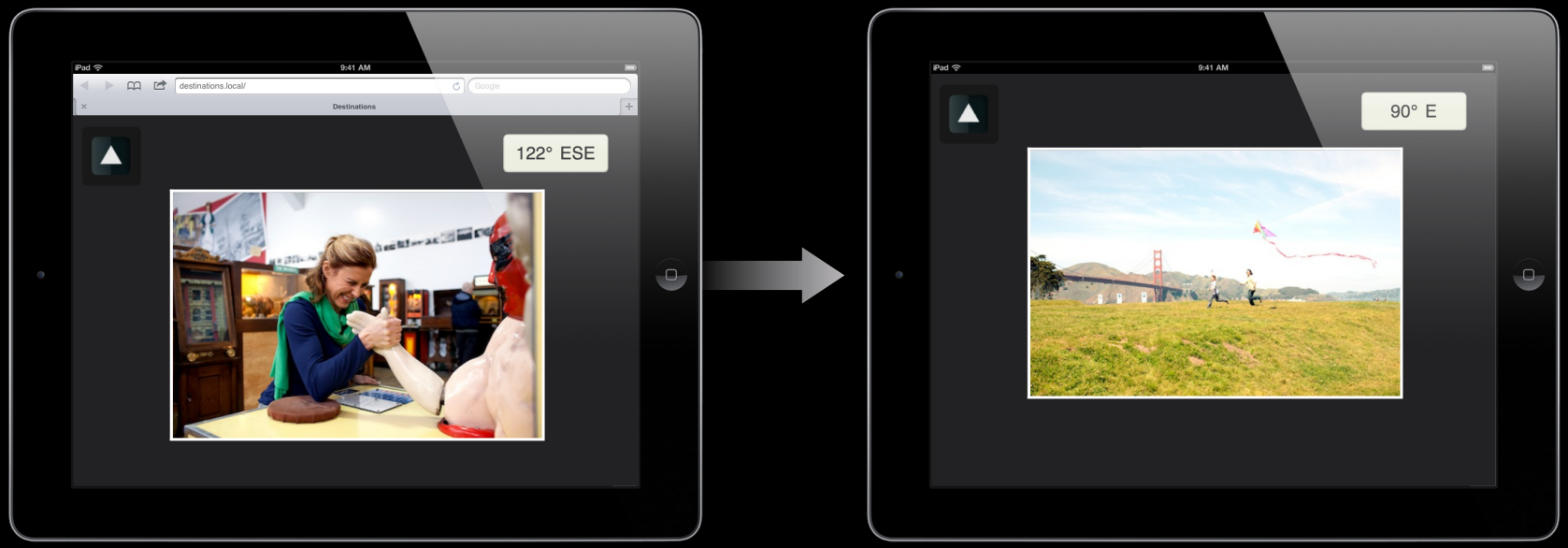
```
<link rel="apple-touch-icon" href="touch-icon-iphone.png" />
<link rel="apple-touch-icon" sizes="72x72" href="touch-icon-ipad.png" />
<link rel="apple-touch-icon" sizes="114x114" href="touch-icon-iphone4.png" />
```

- Disable icon gloss

```
<link rel="apple-touch-icon-precomposed".../>
```

Removing Safari UI Elements

Your Web App is an iOS app!




```
<meta name="apple-mobile-web-app-capable" content="yes">
```

Status Bar to Match Your App

Three colors

- Black
- Black-translucent
- Default

```
<meta name="apple-mobile-web-app-status-bar-style" content="black-translucent">
```

Keep Users in Your Web App

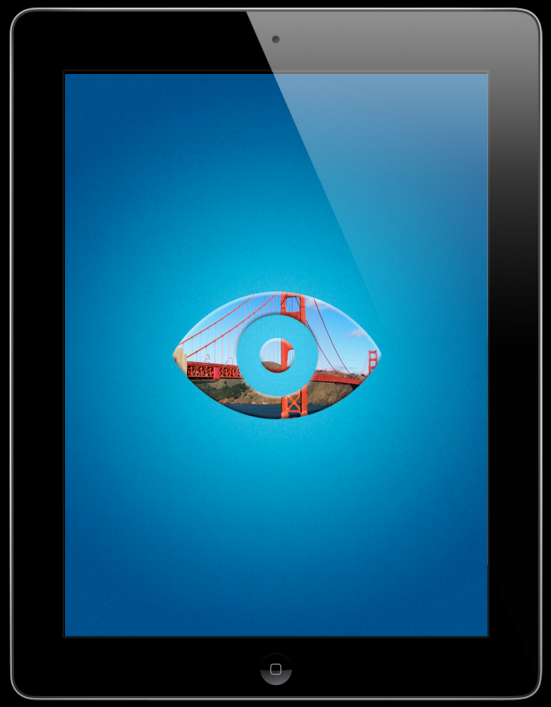
Links open Safari

- Links to other pages will take you out to Safari
- Design your app to use XMLHttpRequest

As Your App Loads…

Make startup images

- On suspend, a screenshot of your Web App was created
- Web Apps are reloaded on launch
- Avoid transition from screenshot to live app with a startup image



As Your App Loads…

Startup images for iPhone and iPod touch

- Portrait orientation only for iPhone, iPod touch
- Use media queries
- 320x460 for iPhone 3GS, iPod touch

```
<link rel="apple-touch-startup-image"
 media="(max-device-width: 480px)
 and not (-webkit-min-device-pixel-ratio: 2)
 href="startup-iphone.png" />
```

- 640x920 for retina display

```
<link rel="apple-touch-startup-image"
 media="(max-device-width: 480px)
 and (-webkit-min-device-pixel-ratio: 2)"
 href="startup-iphone4.png">
```

As Your App Loads…

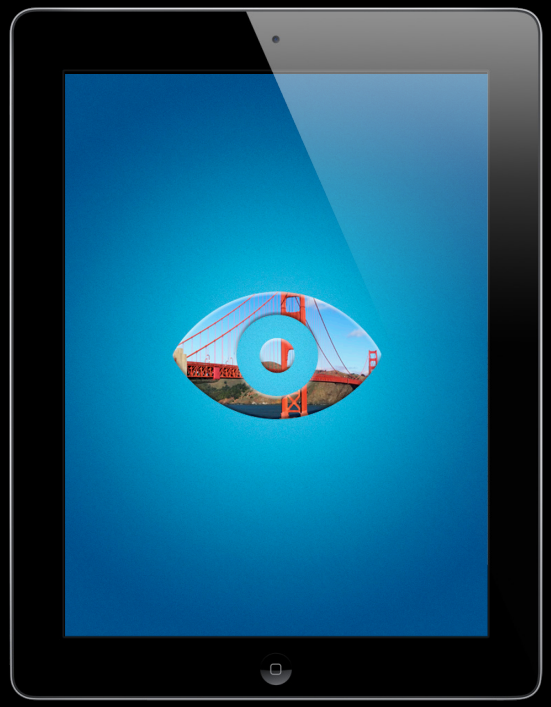
Startup images for iPad with orientation

- Use media queries and exact image dimensions
- Portrait—768x1004

```
<link rel="apple-touch-startup-image"
media="(orientation: portrait)"
href="startup-iPad-portrait.png" />
```

- Landscape—1024x748

```
<link rel="apple-touch-startup-image"
media="(orientation: landscape)"
href="startup-iPad-landscape.png" />
```



Looking Great as an iOS App

Review

- CSS for retina display and orientations
- Launch your Web App as an iOS app
- Looking great on the Home Screen
- As your app loads, show a startup image

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Summary

- Create intuitive UI with touch and gestures
- Add context with geolocation
- Use motion to add a new dimension of interactivity
- Go offline, and load faster
- Tips for Web Apps in iOS

More Information

Vicki Murley
Safari Technologies Evangelist
vicki@apple.com

Documentation
Safari Dev Center
http://developer.apple.com/safari/

DOM Level 3 Events Specification
http://www.w3.org/TR/DOM-Level-3-Events/

Apple Developer Forums
http://devforums.apple.com

Sessions

Using HTML5 Offline Storage	Marina Thursday 3:15PM

Labs

Safari on iOS Lab	Internet and Web Lab A Thursday 9:00AM
HTML5 Offline Storage Lab	Internet and Web Lab B Friday 9:00AM

Q&A

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